



Mail Stop Patent  
Attorney Docket No. 82533

IPW!

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of:

Teow Beng HUR

Serial No.: 10/671,428

Date Filed: September 26, 2003

For: **PANEL FORMWORK SYSTEM**

Group Art Unit: 1755

Confirmation No. 8193

**TRANSMITTAL LETTER**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

Submitted herewith for filing in the U.S. Patent and Trademark Office is the following:

- (1) Transmittal Letter;
- (2) Request for Priority Under 35 U.S.C. § 119; and
- (3) Malaysian Priority Document Application No. PI 2003 1949.

The Commissioner is hereby authorized to charge any deficiency or credit any excess to Deposit Account No. 14-0112.

Respectfully submitted,

**NATH & ASSOCIATES PLLC**

By:

Harold L. Novick

Registration No. 26,011

Customer No. 20529

Date: May 12, 2004

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CLAIM FOR PRIORITY UNDER 35 U.S.C. §119

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In the matter of the above-captioned application, notice is hereby confirmed that the Applicant claims as priority date May 27, 2003, the filing date of the corresponding application filed in Malaysia, bearing Application Number PI 20031949.

A Certified Copy of the corresponding application is submitted herewith.

Respectfully submitted,

Date: May 12, 2004

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Sixth Floor  
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To:

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68000 Ampang, Selangor,  
MALAYSIA

**PATENT APPLICATION NO: PI 2003 1949**

This is to certify that annexed hereto is a true copy from the records of the Registry of Trade Marks and Patents, Malaysia of the application as originally filed which is identified therein.

By authority of the  
REGISTRAR OF PATENTS

  
**ABDUL RAHMAN RAMLI**  
(CERTIFYING OFFICER)  
4 March 2004



Perbadanan Harta Intelek Malaysia  
Intellectual Property Corporation of Malaysia

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## CERTIFICATE OF FILING

APPLICANT : HC PRECAST SYSTEM SDN BHD  
APPLICATION NO : PI 20031949  
REQUEST RECEIVED ON : 27/05/2003  
FILING DATE : 27/05/2003  
AGENT'S/APPLICANT'S FILE REF. : 030208 MBA

Please find attached, a copy of the Request Form relating to the above application, with the filing date and application number marked thereon in accordance with Regulation 25(1).

Date : 10/06/2003

  
\_\_\_\_\_  
(MOHD. AMRAN ABAS)  
for Registrar of Patents

To : MOHD. BUSTAMAN B.HJ. ABDULLAH  
C/O BUSTAMAN & CO,  
LOT C9-3, JALAN SELAMAN 1,  
DATARAN PALMA,  
68000-AMPANG  
MALAYSIA

**Patents Form No. 1**  
**PATENTS ACT 1983**

**REQUEST FOR GRANT OF PATENT**

(Regulations 7(1))

To : The Registrar of Patents  
Patent Registration Office  
Kuala Lumpur  
Malaysia

**For Official Use**

APPLICATION No.: P 20031949

Filing Date.: 27-05-2003

Request received on.: 27-05-2003

\*Fee received on.: 27-05-2003

Amount : RM 200.

\*Cheque/Postal Order/Money Order/Draft/Cash No.:  
B0C 274716

Please submit this Form in duplicate  
together with the prescribed fee.

Applicant's file reference: **030208 MBA**

THE APPLICANT REQUESTS THE GRANT OF A PATENT IN RESPECT OF THE FOLLOWING PARTICULARS:

I. TITLE OF INVENTION: "Panel Formwork System"

II. APPLICANT(S) (the data concerning each applicant must appear in this box or, if the space is insufficient, in the space below):

Name: HC PRECAST SYSTEM SDN. BHD.

H.S.C./Passport No.: -

Address: No. 1 (Grd. Floor), Jalan Singa 20/E, Seksyen 20, 40000 Shah Alam,  
Selangor Darul Ehsan.

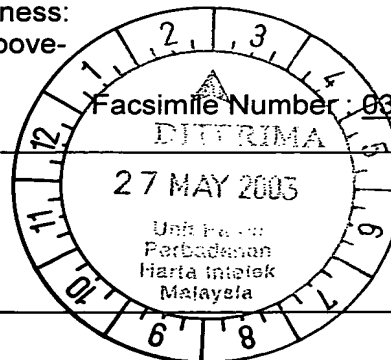
Address for services in Malaysia: Mohd Bustaman Hj Abdullah  
c/o Bustaman & Co.  
Lot C9-3, Jalan Selaman 1, Dataran Palma  
68000 Ampang, Selangor, Malaysia

Nationality: A company incorporated in Malaysia

\*Permanent residence or principal place of business:  
-as above-

Telephone Number : 03-42701819 / 42701820

Additional information (if any)



**20031949**

### III. INVENTOR

Applicant is the inventor:

Yes ☐

No ☒

If the applicant is not the inventor:

Name of inventor Teow Beng Hur  
(a citizen of Malaysia)

Address of inventor: No. 1, Jalan Singa 20/E, Seksyen 20, 40000 Shah Alam,  
Selangor Darul Ehsan

A statement justifying the applicant's right to the patent accompanies this Form :

Yes ☐

No ☒

Additional information (if any)

### IV. AGENT OR REPRESENTATIVE

Applicant has appointed a patent agent in accompanying Form No. 17:

Yes ☒

No ☐

Agent's Registration No.: PA 92-0035

Applicants have appointed : Mohd Bustaman Hj Abdullah  
to be their common representative

### V. DIVISIONAL APPLICATION

This application is a divisional application:

☐

The benefit of the filing date

☐

priority date

☐

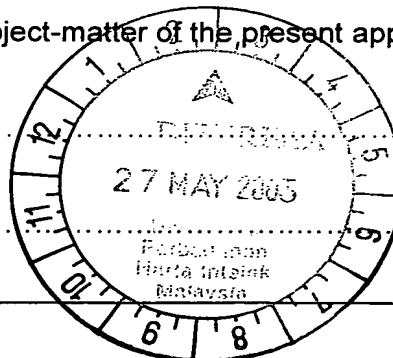
of the initial application is claimed in as much as the subject-matter of the present application is contained in the initial application identified below:

Initial Application No. :

.....

Date of filing of initial application :

.....



20031949

VI. DISCLOSURE TO BE DISREGARDED FOR PRIOR ART PURPOSES:

Additional information is contained in supplemental box:

(a) Disclosure was due to acts of applicant or his predecessor in title: ☐

Date of disclosure : .....

(b) Disclosure was due to abuse of rights of applicant or his predecessor in title ☐

Date of disclosure : .....

A statement specifying in more detail the facts concerning the disclosure accompanies this Form:

Yes ☐

No ☒

Additional information (if any)

VII. PRIORITY CLAIM (if any)

The priority of an earlier application is claimed as follows:

Country (if the earlier application is a regional or international application, indicate the office with which it is filed) : -

Filing Date : -

Application No. : -

Symbol of the International Patent Classification:

If not yet allocated, please tick: ☒

The priority of more than one earlier application is claimed:

Yes ☐

No ☒

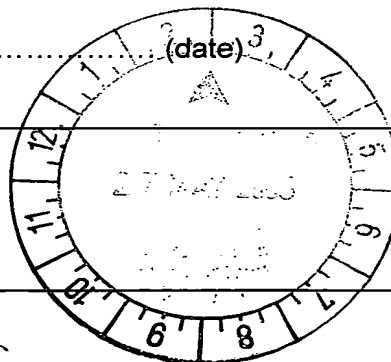
The certified copy of the earlier application(s) accompanies this Form:

Yes ☐

No ☒

If No, it will be furnished by .....

Additional Information (if any)



20031949

VIII. CHECK LIST

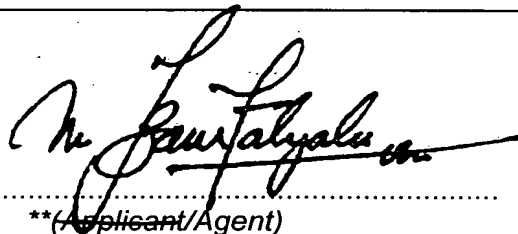
A. This application contains the following:

1. request
2. description 6 sheets
3. claim 2 sheets (10 claims)
4. abstract 1 sheets
5. drawings 5 sheets
- Total 14 sheets

B. This Form, as filed, is accompanied by the items checked below:

- (a) signed Form No. 17 ☒
- (b) declaration that inventor does not wish to be named in the patent ☐
- (c) statement justifying applicant's right to the patent ☐
- (d) statement that certain disclosures be disregarded ☐
- (e) priority document (certified copy of earlier application) ☐
- (f) cash, cheque, money order, banker's draft or postal order for the payment of application fee ☒
- (g) other documents (specify) ☐

IX. SIGNATURE

  
\*\*(Applicant/Agent)

27 MAY 2003

(Date)

If Agent, indicate Agent's Registration No. : MOHD BUSTAMAN HJ ABDULLAH PA 92-0035

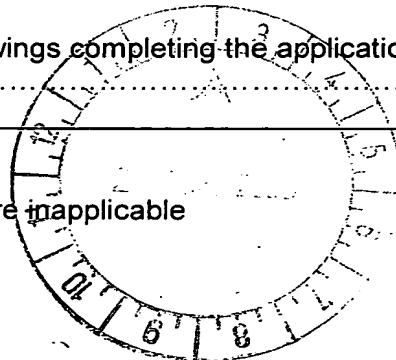
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1. Date application received: .....
2. Date of receipt of correction, later filed papers or drawings completing the application: .....

\* Delete where inapplicable

\*\* Type name under signature and delete where inapplicable

20031949





## **PANEL FORMWORK SYSTEM**

This invention relates to formwork system for use in casting prefabricated panels. The formwork system is particularly suited for use with wall panels and it will be convenient to hereinafter describe the invention in relation to this particular application. It should be appreciated however that the invention is not limited to prefabricated wall panels but rather is intended to include other panels such as floor slab panels.

## **BACKGROUND TO THE INVENTION**

Conventional formwork system used in casting prefabricated wall panels are generally made up of cumbersome parts that must be assembled to define the sides of the panel to be cast. The formwork system generally includes a platform defining a surface of the panel and a number of side forms defining the sides of the panel to be cast. The side forms are normally braced to the platform by bolting the side forms to the platform. This is very time consuming, as it requires manual labour to bolt the side forms to the platform. Furthermore, to remove the cast panel from the formwork system, it is normally necessary to unbolt the bracing from the platform, which is again time consuming. This arrangement of bolting the side forms to the platform does not facilitate adjusting the relative positions of the side forms to adjust the width and length dimensions of the panel to be cast. In some methods, the width can be varied but the height of the wall panel is always fixed. Whilst these moulds allow flexibility in width, the holding method of side moulds are usually not firm and this leads to bulging at the edge of wall panel and escape of grout during casting of wall panels.

It would be advantageous to provide an improved formwork system that addressed this problem.

## **SUMMARY OF THE INVENTION**

According to this invention, there is provided formwork system for use in casting prefabricated panels, the formwork system includes:

5 a support structure including a platform defining a surface of the panel to be cast, and a sub-structure supporting the platform;

a plurality of side forms being positionable on the platform to define sides of the panel to be cast;

10 each side form being braced by at least one brace structure connected to the support structure for bracing the plurality of side forms in position, each brace structure having adjustment means for permitting adjustment of the position of each side form on the platform to adjust the length and width dimensions of the panel to be cast.

15 It is preferred that each brace structure also includes an abutment connected to the sub-structure, a strut extending from the side form, the adjustment means providing a connection between the strut and the abutment that permits adjustment of the position of each side form on the platform.

20 The adjustment means in one preferred embodiment includes a threaded bore associated with the abutment and a threaded shaft forming at least in part the strut which is received by the threaded bore so that rotation of the shaft relative to the bore causes adjustment of the strut and the side form relative to the abutment.

25 The adjustment means in another preferred embodiment includes an edge associated with the abutment about which the strut pivots, a height adjuster is located at a distal end of the strut for adjusting the position of the distal end of the strut relative to the sub-structure, a proximal end of the strut engages the side form so that elevating the position of the distal end of the strut creates a clamping force at the proximal end of the strut clamping the side form in position on the platform. It is further preferred that the height adjuster includes a threaded bore associated with the distal end of the strut, and a threaded shaft received by the threaded bore, a distal end of the threaded shaft

30

engages the sub-structure so that rotation of the threaded shaft relative to the threaded bore causes the elevation of the distal end of the strut to alter, to thereby alter the clamping force.

5        It is still further preferred that the formwork system includes a plurality of sets of side forms each set varying in height to permit casting of panels of varying thickness.

10        Preferably the sub-structure includes steel beams and/or channels which provide support to the platform.

It is preferred that the platform is designed to impart a pattern into the surface of the panel.

15        It is also preferred that each side form is designed with a profile to impart a shape into the side of the panel to be cast.

### **DESCRIPTION OF PREFERRED EMBODIMENTS**

20        The invention will be hereinafter described with reference to the accompanying drawings which illustrate two preferred embodiments of the invention. The drawings however are merely illustrative of how the invention might be put into effect, so that the specific form and arrangement of the features shown is not to be understood as limiting on the invention.

25

Figure 1.0 is a plan view showing the formwork system for casting prefabricated wall panels with retractable bracing according to the invention.

30        Figure 2.0 is a side view of a linear retractable bracing system according to one preferred embodiment of the invention.

Figure 3.0 is a side view of a lever retractable bracing system according to another preferred embodiment of the invention.

Figure 4.0 is a plan view showing the formwork system for casting prefabricated wall panels with pattern and decorative features.

Figure 5.0 is a cross section showing the formwork system for casting prefabricated wall panels with pattern and decorative features.

As shown in figure 1.0, the formwork system comprises a mould 1 supported by a support structure including a sub-structure of beams 2 and channels 3, and two types of retractable bracing systems at the sides of the support structure.

According to the embodiment illustrated, linear 4 and/or lever 5 retractable braces are located adjacent the four sides of the support structure. Figure 2.0 and figure 3.0 describe the operation of the linear and lever retractable braces in more detail.

As shown in figure 2.0, linear retractable brace is fitted and held firmly to the sub-structure. The linear retractable brace illustrated consists of a horizontal threaded circular tube 6 that is mounted through a vertical hollow section 7. The vertical hollow section 7 is fitted onto an abutment or bracket 8 that is welded to the I-beam 9 section of the sub-structure. The hollow section 7 is held firmly in place with the use of two pins that are inserted through holes 10 on the walls of vertical hollow section 7 and bracket 8. The threaded circular tube 6 can be rotated by using the handle 11. The other end of the threaded circular tube 6 is mounted onto a plate 12 that fits into the side form 13. Rotation of the threaded circular tube 6 relative to the hollow section 7 allows the side form to be extended or retracted, and hence provides a guide for the side form 13 to be adjusted in order to produce the required height and width of wall panel.

The brace, as shown in figure 3.0, is a lever retractable brace fitted and held firmly to the substructure. This brace consists of a horizontal lever 14 that is mounted through a vertical hollow section 7. The vertical hollow section 7 is fitted onto an abutment or bracket 8 that is welded to the I-beam 9 section of the

sub-structure. The vertical hollow section 7 is held firmly in place with the use of two pins that are inserted through holes 16 on the walls of vertical hollow section 7 and bracket 8. A distal end of the horizontal lever 14 has a threaded shaft 17 with a handle 18 on top that extends vertically to the I-beam section 9 of the sub-structure. The proximal end of the horizontal level 14 projects downwards to be in contact with the base 19 of the side formwork 13. Rotation of the handle 18 in one direction gives the threaded shaft 17 a tight contact down vertically with the I-beam 9 section of the sub-structure. This results in a force being exerted downwards at the proximal end of the horizontal level 14 that is in contact with the base 19 of the side form 13. By tightening the threaded shaft 17 to the I-beam 9 section of the sub-structure at the distal end of the horizontal lever 14 using the handle 18, a downward force will be exerted on the proximal end of the horizontal lever 14 that will lead to the horizontal lever 14 clamping down to the base 19 of the side form 13. This action of the lever retractable brace allows the side form 13 to be in firm and tight contact with the base of the mould 20 that will prevent the escape of grout during casting wall panels and bulging at the edges of wall panels.

The side form can be formed using aluminium or mild steel.

Shear key joint can be cast in the prefabricated wall panel by using the appropriate profile of side form. This shear key, coupled with starter bars, provides a very strong interlocking and high building strength after the joints in between the wall panels have been cast.

As shown in figure 4.0 and figure 5.0, the platform may, if desired, be shaped to impart various patterns and decorative features to the prefabricated wall panels. Using differently shaped modules can vary the pattern of any decorative features. Patterns on the wall surface can be designed by incorporating specially designed channels 21, 22 in the platform. The patterned channels 21, 22 are extruded using aluminium. By using these patterned channels 21, 22, the shape of the protruded pattern on the wall can be varied. The patterned channels 21, 22 can be eliminated if no design is required. This can be done by either replacing the pattern channel with a flat plate or filling the

pattern channel with concrete to obtain a flat surface. The recessed pattern on the wall panel can be incorporated by placing a timber board on the wall mould. A door or window opening 23 can be incorporated by either casting together with the door or window frame, or the area 23 is blocked using a formwork. The door or window frame is held firmly to the wall mould using steel hollow section tightened with fasteners.

The width of the mounts varies with an increment of 1 m by using standard length of retractable clamping system; each size of mould allows flexibility by adjusting the width of wall panel of up to 500 mm on each side.

The standard formwork mould can cast up to a height of 3.6 m. The formwork system mould can be extended with a modular extension mould. With the extended formwork system mould, higher heights of wall panel can be prefabricated. The extension mould also has a set of retractable clamping systems around its three sides. The length of side formwork is adjusted accordingly to achieve different height of wall panels. With the adjustability of the moulds, the number of different moulds for casting prefabricated wall panels of various sizes is greatly reduced.

The formwork system as hereinbefore described has many advantages over conventional formwork system. These advantages stem principally from the ability for the brace structure of the invention to be adjustable to adjust the position of the side forms on the platform. This allows a single formwork system to cast a range of panels all varying in height and length.

Various alterations, modifications and/or additions may be introduced into the constructions and arrangements of parts previously described without departing from the spirit or ambit of the invention as defined by the appended claims.

## **CLAIMS**

1. Formwork system for use in casting prefabricated panels, the formwork  
5 system including:

a support structure including a platform defining a surface of the panel to be cast, and a sub-structure supporting the platform;

a plurality of side forms being positionable on the platform to define sides of the panel to be cast;

10 each side form being braced by at least one brace structure connected to the support structure for bracing the plurality of side forms in position, each brace structure having adjustment means for permitting adjustment of the position of each side form on the platform to adjust the length and width dimensions of the panel to be cast.

15

2. Formwork system according to claim 1, wherein each brace structure also includes an abutment connected to the sub-structure, a strut extending from the side form, the adjustment means providing a connection between the strut and the abutment that permits adjustment of the position of each side form  
20 on the platform.

3. Formwork system according to claim 2, wherein the adjustment means includes a threaded bore associated with the abutment and a threaded shaft forming at least in part the strut which is received by the threaded bore so that  
25 rotation of the shaft relative to the bore causes adjustment of the strut and the side form relative to the abutment.

4. Formwork system according to claim 2, wherein the adjustment means includes an edge associated with the abutment about which the strut pivots, a  
30 height adjuster is located at a distal end of the strut for adjusting the position of the distal end of the strut relative to the sub-structure, a proximal end of the strut engages the side form so that elevating the position of the distal end of the strut creates a clamping force at the proximal end of the strut clamping the side form in position on the platform.

5. Formwork system according to claim 4, wherein the height adjuster includes a threaded bore associated with the distal end of the strut, and a threaded shaft received by the threaded bore, a distal end of the threaded shaft engages the sub-structure so that rotation of the threaded shaft relative to the threaded bore causes the elevation of the distal end of the strut to alter, to thereby alter the clamping force.
6. Formwork system according to any one of the preceding claims, wherein the formwork system includes a plurality of sets of side forms each set varying in height to permit casting of panels of varying thickness.
7. Formwork system according to any one of the preceding claims, wherein the sub-structure includes beams and/or channels which provide support to the platform.
8. Formwork system according to any one of the preceding claims, wherein the platform is designed to impart a pattern onto the surface of the panel.
9. Formwork system according to any one of the preceding claims, wherein each side form is designed with a profile to impart a shape into the side of the panel to be cast.
10. Formwork system according to any one of the preceding claims, wherein the mould can be extended using modular extension mould to prefabricate higher heights of wall panel.



## **PANEL FORMWORK SYSTEM**

### **ABSTRACT**

5

Formwork system for the process of casting prefabricated wall and slab panels that is flexible in width and height is provided. This formwork system includes two types of retractable bracing structures that are located on the sides and ends of mould structure. The height and width of panels can be varied by moving the linear retractable bracing structure, while the lever retractable bracing structure holds the side form firmly by clamping down the side form to the platform of the support structure. The thickness of the panel to be cast can be varied by using different modules of side form that are designed to produce a series of modules of various heights. Various patterns on the wall can be designed by incorporating specially designed channels in the mould.

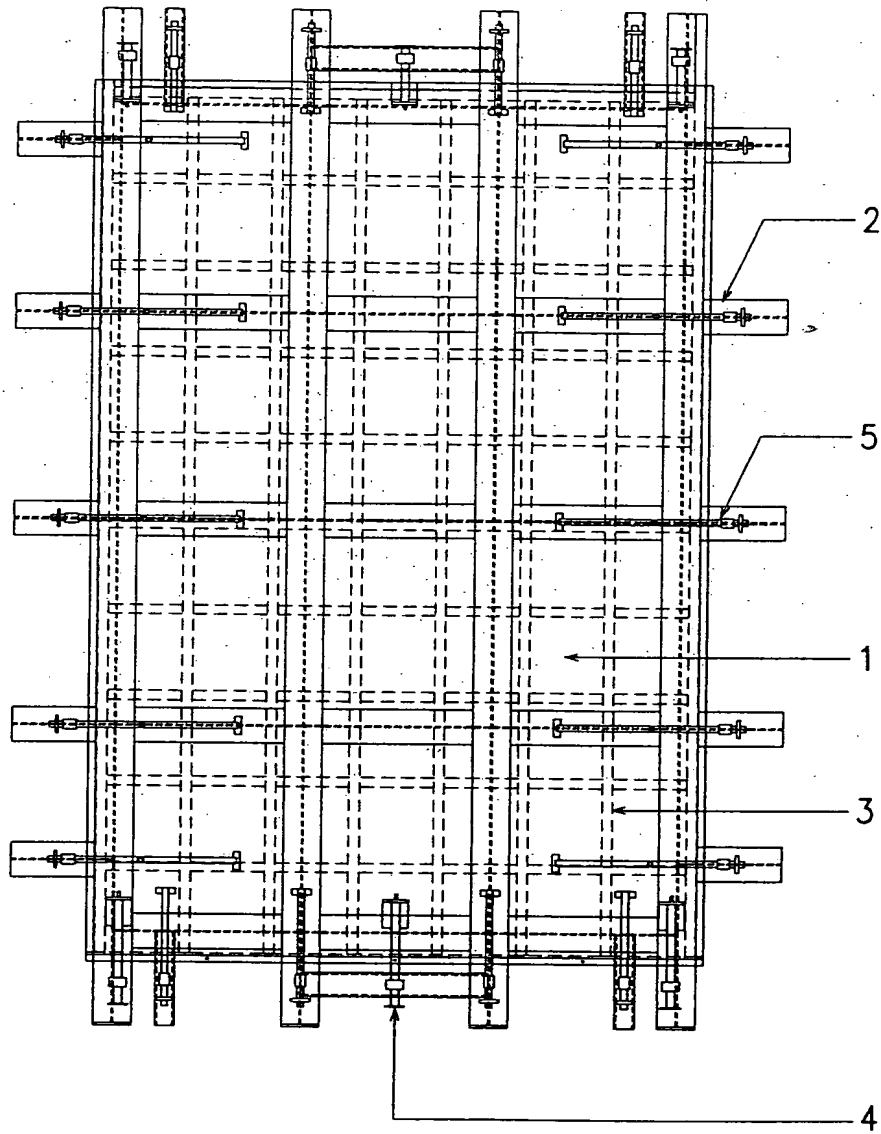


FIGURE 1.0

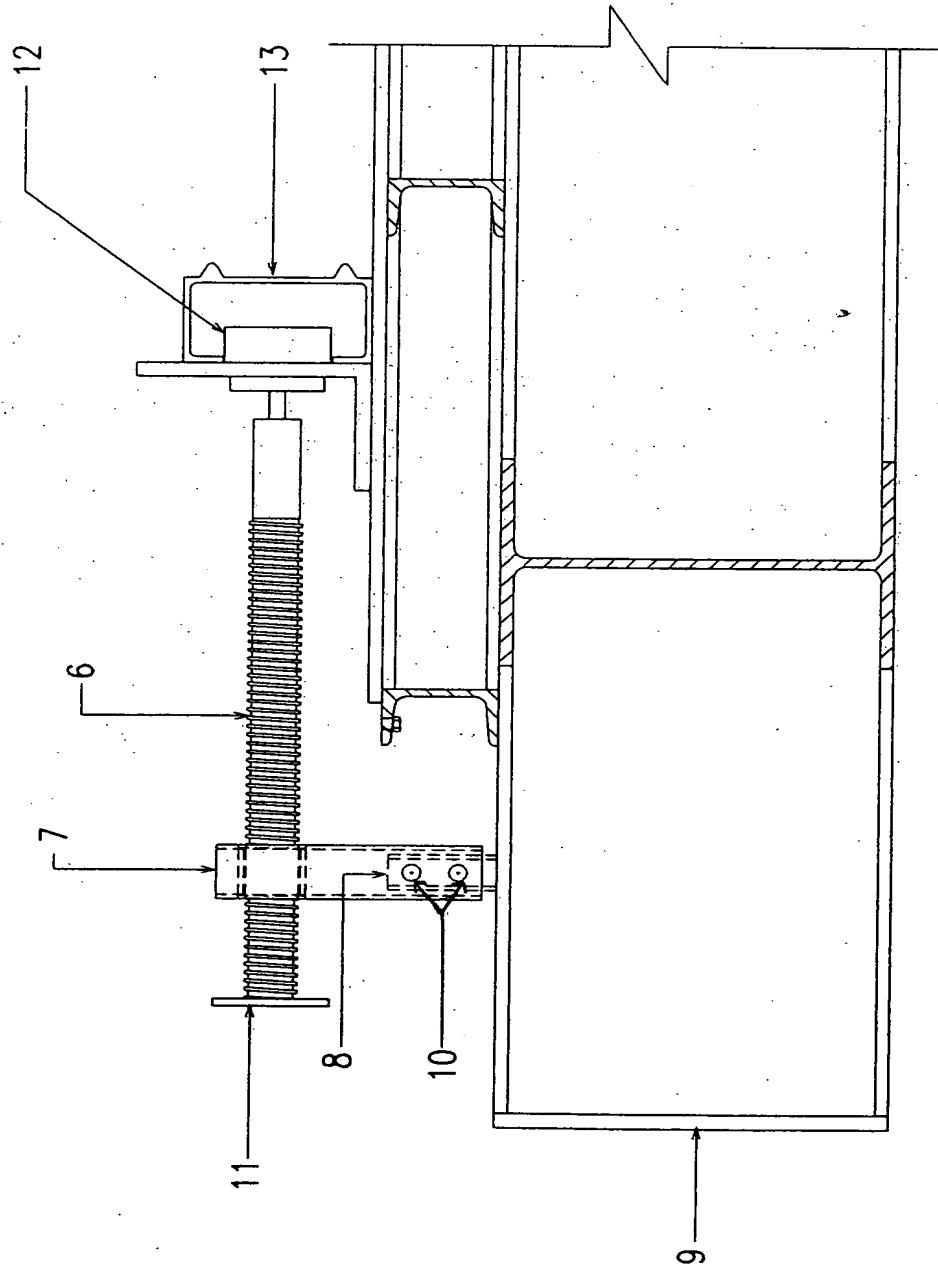


FIGURE 2.0

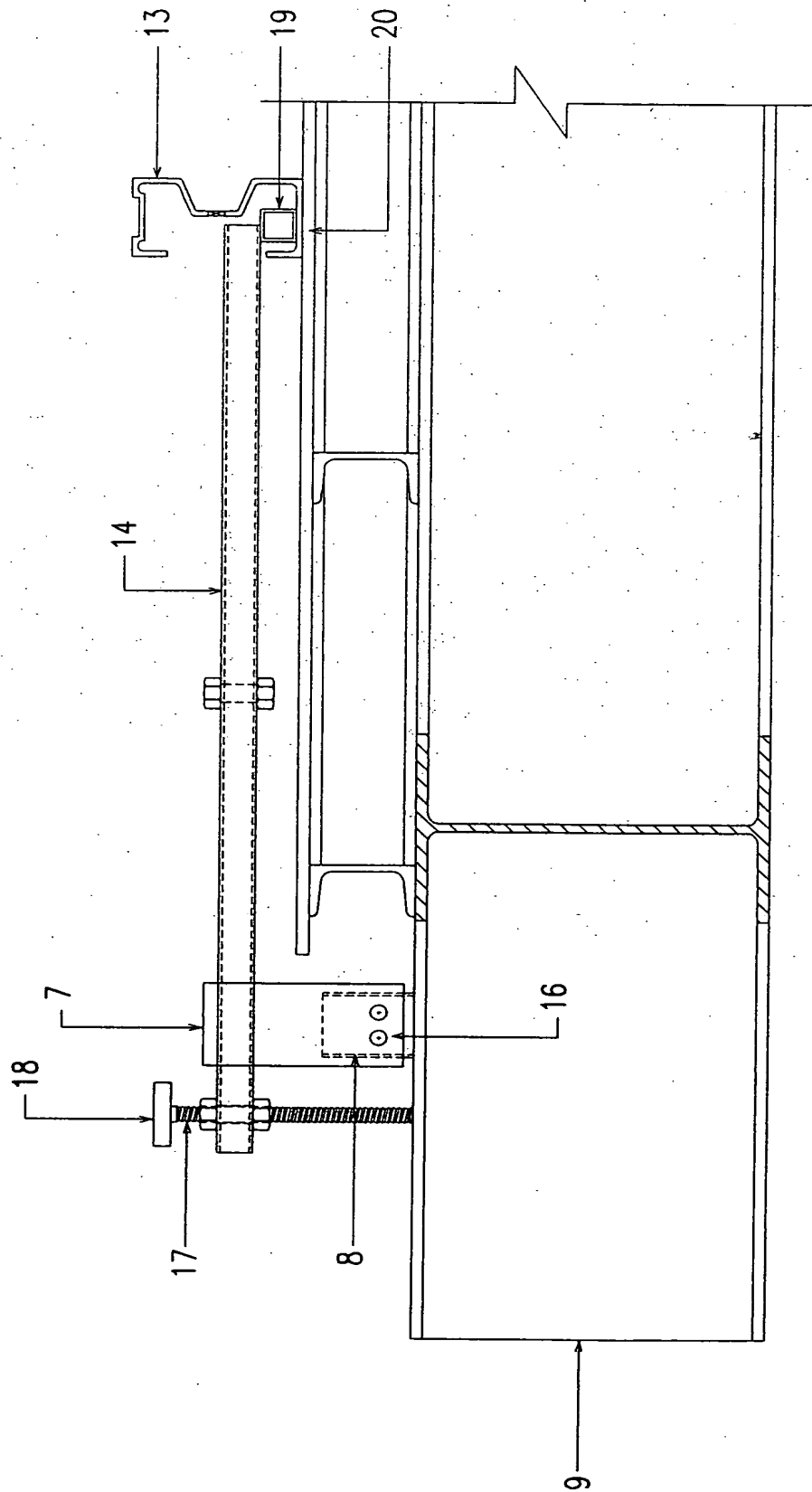


FIGURE 3.0

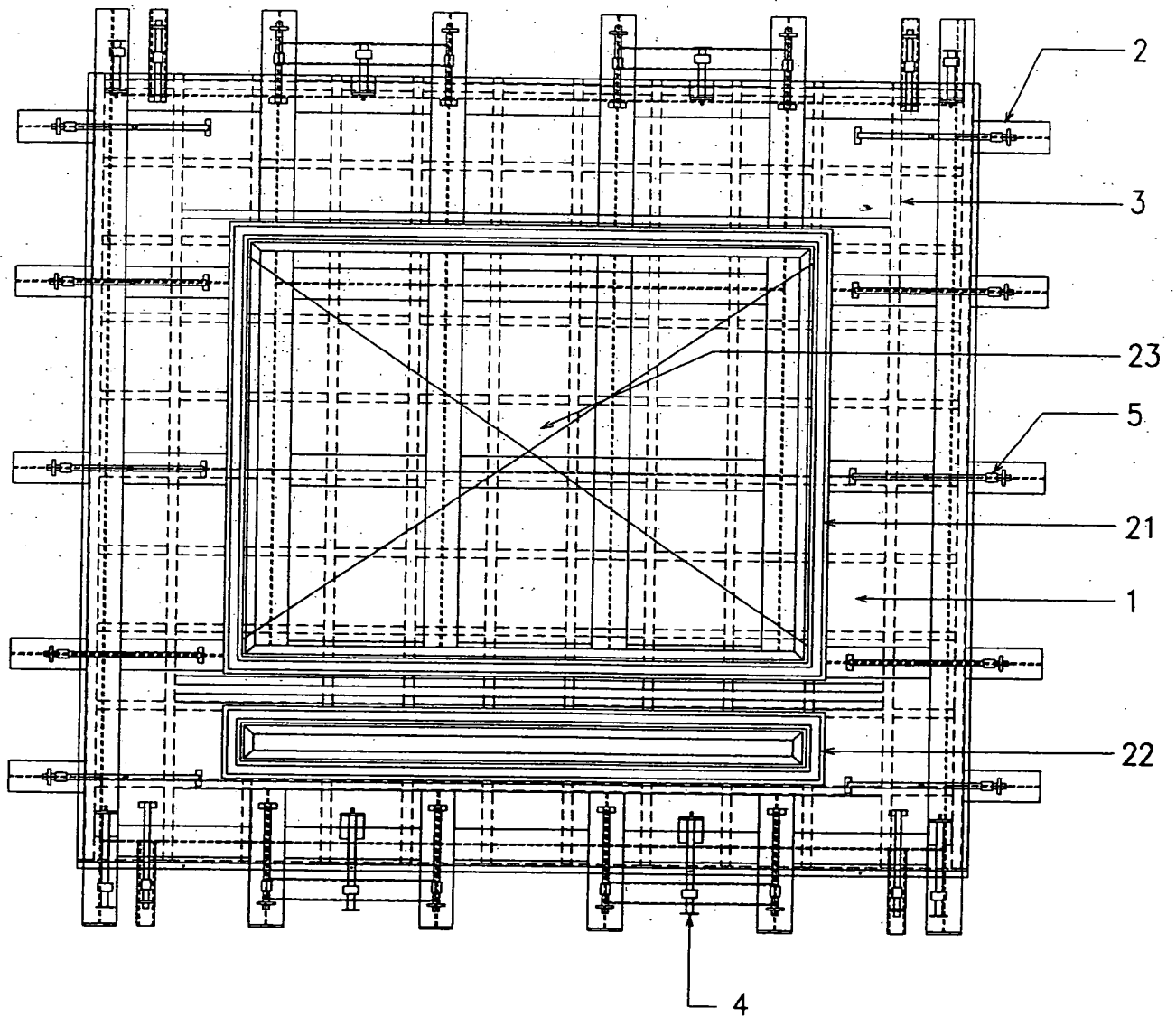


FIGURE 4.0

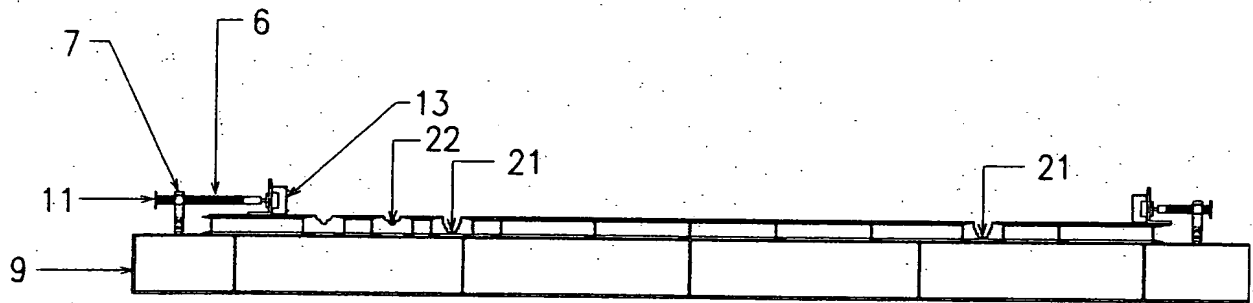


FIGURE 5.0